

Claims

The listing of claims will replace all prior versions, and listings of claims in the application.

41. (Previously Presented) A method, comprising:
biasing an active circuit using at least one resistor; and
reducing thermal noise generated by the at least one resistor using feedback coupled in parallel with the active circuit.
42. (Previously Presented) The method of claim 41, wherein biasing the active circuit includes biasing the active circuit having an active element coupled in parallel with a resonator.
43. (Previously Presented) The method of claim 41, further including causing the active element to oscillate at a resonant frequency to produce a periodic signal.
44. (Previously Presented) The method of claim 43, further including tuning the resonant frequency to compensate for a frequency shift associated with the feedback.
45. (Previously Presented) The method of claim 44, wherein tuning the resonant frequency includes adjusting a capacitance coupled to the active circuit.
46. (Previously Presented) The method of claim 41, wherein reducing the thermal noise includes reducing the thermal noise generated by the at least one resistor using direct current (DC) feedback coupled in parallel with the active circuit.

47. (Previously Presented) The method of claim 46, wherein biasing the active circuit includes biasing the active circuit having a first terminal and a second terminal, and reducing the thermal noise includes shorting the thermal noise across the first terminal and the second terminal.

48. (Previously Presented) An apparatus, comprising:
means for biasing an active circuit; and
means for reducing thermal noise generated by the means for biasing, the means for reducing thermal noise coupled in parallel with the active circuit.

49. (Previously Presented) The apparatus of claim 48, wherein the active circuit is to provide a periodic signal based on a resonant frequency of a resonator.

50. (Previously Presented) The apparatus of claim 49, wherein the active circuit is coupled in parallel with the resonator.

51. (Previously Presented) The apparatus of claim 50, wherein the active circuit includes a first transistor cross-connected with a second transistor, the first and second transistors to oscillate at the resonant frequency.

52. (Previously Presented) The apparatus of claim 51, wherein a gate of the first transistor is connected to a drain of the second transistor, a gate of the second transistor is connected to a drain of the first transistor, and the drains of the first and second transistors form a differential output.

53. (Previously Presented) The apparatus of claim 52, wherein the gate of the first transistor is connected to the drain of the second transistor through a first capacitor

and the gate of the second transistor is connected to the drain of the first transistor through a second capacitor.

54. (Previously Presented) The apparatus of claim 49, wherein the means for reducing thermal noise includes an inductor and a resistor connected in series.

55. (Previously Presented) The apparatus of claim 54, wherein the inductor is large enough that a parasitic resonance caused by the inductor is lower in frequency than the resonant frequency of the resonator by at least a factor of the square root of 0.1.

56. (Previously Presented) The apparatus of claim 55, wherein the resistor is large enough to prevent the active circuit from oscillating at the parasitic resonance.

57. (Previously Presented) The apparatus of claim 49, wherein the resonator is a crystal resonator.

58. (Previously Presented) The apparatus of claim 49, further including a first output terminal and a second output terminal, and a first capacitor is coupled to the first terminal and a second capacitor is coupled to the second terminal, the first and second capacitors capable of compensating for a frequency shift associated with the means for reducing thermal noise.

59. (Previously Presented) The apparatus of claim 48, wherein the active circuit includes a differential output to oscillate at the resonant frequency.

60. (Previously Presented) The apparatus of claim 48, wherein the active circuit includes a first terminal and a second terminal, and the means for reducing thermal noise shorts the thermal noise across the first terminal and the second terminal.

61. (Previously Presented) The apparatus of claim 48, wherein the means for biasing includes a plurality of transistors and a plurality of resistors.